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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IFW
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1763

In the application of:

Trung T. Doan

Serial No.: 09/652,713

Filed: August 31, 2000

For: CHEMICAL DISPENSING SYSTEM FOR
SEMICONDUCTOR WAFER PROCESSING

§ Group Art Unit: 1763
§ Examiner: S. MacArthur
§ Atty. Docket: 93-0421.04
§
§
§

TRANSMITTAL OF APPEAL BRIEF AND FEE AUTHORIZATION

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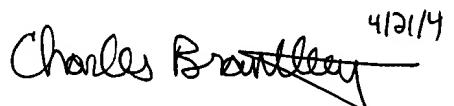
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Enclosed herewith is Applicant's Appeal Brief, submitted in triplicate. The Commissioner is authorized to charge the appropriate fee under 37 C.F.R. §1.17(c) of \$330.00, as well as any other required fee, to Micron Technology, Inc. Deposit Account No. 13-3092, Order No. 93-0421.04. This transmittal is being submitted in duplicate.

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01 FC:1402 330.00 DA

Respectfully submitted,


4/21/04

Charles B. Brantley II, Reg. No. 38,086
Micron Technology, Inc.
8000 S. Federal Way
Mail Stop 525
Boise, ID 83716-9632
(208) 368-4557

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 330)

Complete if Known	
Application Number	09/652,713
Filing Date	August 31, 2000
First Named Inventor	Trung T. Doan
Examiner Name	S. MacArthur
Art Unit	1763
Attorney Docket No.	93-0421.04

METHOD OF PAYMENT (check all that apply)

 Check Credit card Money Other None
Order
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Deposit Account Number 13-3092, Order No. 93-0421.04

Deposit Account Name Micron Technology, Inc.

The Director is authorized to: (check all that apply)

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 Charge any additional fee(s) during the pendency of this application
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FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code (\$)	
1001	770	2001	385
1002	340	2002	170
1003	530	2003	265
1004	770	2004	385
1005	160	2005	80
SUBTOTAL (1)		(\$ 0)	

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims	Fee from below	Fee Paid
Total Claims	2	-20 **	= 0	X 18 = 0
Independent Claims	1	-3 **	= 0	X 86 = 0
Multiple Dependent				X = 0

Large Entity Small Entity

Large Entity	Small Entity	Fee Description	
Fee Code	Fee (\$)	Fee Code (\$)	
1202	18	2202	9
1201	86	2201	43
1203	290	2203	145
1204	86	2204	43
1205	18	2205	9
SUBTOTAL (2)		(\$ 0)	

*or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity	Small Entity	Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code (\$)	
1051	130	2051	65
1052	50	2052	25
1053	130	1053	130
1812	2,520	1812	2,520
1804	920*	1804	920*
1805	1,840*	1805	1,840*
1251	110	2251	55
1252	420	2252	210
1253	950	2253	475
1254	1,480	2254	740
1255	2,010	2255	1,005
1401	330	2401	165
1402	330	2402	165
1403	290	2403	145
1451	1,510	1451	1,510
1452	110	2452	55
1453	1,330	2453	665
1501	1,330	2501	665
1502	480	2502	240
1503	640	2503	320
1460	130	1460	130
1807	50	1807	50
1806	180	1806	180
8021	40	8021	40
1809	770	2809	385
1810	770	2810	385
1801	770	2801	385
1802	900	1802	900
Other fee (specify) _____			

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3)

(\$ 330)

SUBMITTED BY		Complete (if applicable)	
Name (Print/Type)	Charles Brantley	Registration No. (Attorney/Agent)	38,086 Telephone 208-368-4557
Signature	<i>Charles Brantley</i>	Date	4/21/04

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APPLICANT'S BRIEF ON APPEAL

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Susan Jerome
Signature

Charles B. Brantley II, Reg. No. 38,086
Micron Technology, Inc.
8000 S. Federal Way
Mail Stop 525
Boise, ID 83716-9632
(208) 368-4557

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Appendix 1: Copy of Involved Claims

Appendix 2: Examiner's Response to BPAI's Instruction, mailed 10/08/03, for U.S. App. Ser. No. 09/305,865

Appendix 3: Definition of "configure" from MERRIAM WEBSTER'S COLLEGIATE DICTIONARY (10th ed.)

Appendix 4: Definition from AMERICAN HERITAGE ELECTRONIC DICTIONARY (1992)

Appendix 5: U.S. Pat. No. 6,311,365 by Dornier

Appendix 6: European Pat. No. 1238766 by Caspar

Appendix 7: U.S. Pat. No. 6,341,387 by Zars

Appendix 8: U.S. Pat. No. 4,938,239 by Theurer

Appendix 9: U.S. Pat. No. 4,522,575 by Tischer

Appendix 10: U.S. Pat. No. 3,939,065 by Einersson



APPLICANT'S BRIEF ON APPEAL

I. REAL PARTY IN INTEREST

The Applicant, Trung Doan, has assigned his interest in this application to Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

On February 19, 2002, Applicant submitted a Notice of Appeal as part of the prosecution of application serial no. 09/133,989, which was filed August 14, 1998. Application '989 is the parent application to the current application under appeal. Applicant's latest act was to file a Reply Brief on 11/7/03. Applicant received an Appeal Docketing Notice mailed 2/20/04.

On February 28, 2002, Applicant submitted an Appeal Brief as part of the prosecution of application serial no. 09/652,969, which was filed August 31, 2000. Application '969 is a divisional of '989 and therefore a sibling of the current application under appeal. The Board reversed the Examiner in a decision dated 7/29/03. The Examiner mailed a Notice of Allowance on 1/7/04. Applicant paid the issue fee on 1/15/04.

III. STATUS OF THE CLAIMS

Claims 1-43 have been presented during prosecution of the application under appeal.

Claims 1-35 and 38-43 have been canceled.

Claims 36-37 are pending.

Claims 36-37 are rejected under 35 U.S.C. §112, ¶2.

Claims 36-37 are appealed.

IV. STATUS OF THE AMENDMENTS

Applicant filed no amendments subsequent to final rejection.

V. SUMMARY OF THE INVENTION

The current invention addresses a device for an edge bead. The device comprises a dispenser configured to release a chemical toward the edge bead (specification at p. 3, ln. 17-18; p. 4, ln. 14-16; FIGS. 1&2) and a splash controller around the dispenser (*id.* at p. 3, ln. 18-19; p. 4, ln. 5-6; FIGS. 1&2). The splash controller is physically unattached from the edge bead (FIGS. 1&2) and is configured to draw the chemical toward the splash controller (*id.* at p. 4, ln. 3-5, 16-18). The splash controller is also configured to generate a gas pressure around the edge bead that is lower than an ambient gas pressure (*id.* at p. 3, ln. 3-7, 16-18; FIGS. 1&2) and further configured to physically intercept the chemical (*id.* at p. 4, ln. 8-10; FIGS. 1&2). In a more limited embodiment, the splash controller is around the edge bead (*id.* at p. 4, ln. 16-18; FIG. 2).

VI. ISSUE

There is one issue for determination on appeal: whether the Examiner had the authority to determine that the claims meet the definiteness requirement of §112, ¶2, despite the Board's indication to the contrary.

VII. GROUPING

Applicant defines the following group of claims for consideration upon this appeal. This group corresponds to the issue listed above.

Group 1: claims 36-37.

VIII. ARGUMENT

Before addressing the issue directly, Applicant contends the Board will benefit from a brief summary of the prosecution history. Such a history will help demonstrate that the Examiner had the authority to reconsider the Board's decision on indefiniteness. Moreover, prosecution economy would favor the Board now finding the claims to be sufficiently definite.

Prosecution economy would further favor retaining the reversal of the Examiner's previous rejection.

A. Brief Summary of Prosecution History

Applicant appealed the Examiner's §102 rejection of claims 36-37, presenting arguments in an Appeal Brief (transmitted 4/24/02) and a Reply Brief (transmitted 6/25/02).

The Board's decision dated 11/29/03 reversed the Examiner's §102 rejection and raised a §112, ¶2 indefiniteness rejection.

On 9/26/03, Applicant submitted a Showing of Facts and Response to the Board Decision to the Examiner (hereinafter referred to as the Showing and Response) supporting the definiteness of the claims. In the event that the Showing and Response was inadvertently truncated, Applicants faxed the substance of the Showing and Response on 10/23/03.

In the Office Action dated 11/14/03, the Examiner indicated a belief that the Examiner lacked authority to reconsider the Board's decision concerning indefiniteness.

In a Response transmitted 12/11/03, Applicant argued in favor of the Examiner's authority to reconsider the Board's decision concerning indefiniteness. Applicant once again included the substance of the Showing and Response transmitted 10/23/03

In an Advisory Action dated 12/29/03, the Examiner reiterated the belief that the Examiner lacked authority to reconsider the Board's decision concerning indefiniteness.

On 2/17/04 Applicant filed a Request for Continued Examination and a Notice of Appeal.

Curiously, the Examiner subsequently mailed an Office Action dated 3/11/04. The §112 arguments presented in that Office Action are substantially identical to the language of the Board's decision dated 11/29/03.

B. The Examiner has the authority to determine if the claims meet the definiteness requirement of §112, ¶2

The Examiner's Office Action dated 11/14/03 and Advisory Action dated 12/29/03 indicate the Examiner's belief that the Examiner lacks authority to reconsider the Board's decision concerning the indefiniteness of the claim term "splash controller." Applicant contends that the

Examiner's belief is in error. The Board itself indicates that the matter can be "reconsidered by the examiner," citing 37 C.F.R. §1.196(b) as authority. (Board Decision at p. 8.) The language from that section of the C.F.R. further supports the Board's statement and Applicant's argument. Specifically, 37 C.F.R. §1.196(b) indicates that "[a] new ground of rejection" -- such as the current Board's §112 rejection -- "shall not be considered final for purposes of judicial review." Rather, in such a circumstance, Applicant may submit "a showing of facts" and "have the matter *reconsidered by the examiner.*" (37 C.F.R. §1.196(b) (emphasis added).) Section 1.196(b) further indicates that, upon a sufficient showing of facts that were not previously made of record, the Examiner (1) is not bound by the Board's new ground of rejection; and (2) may in fact find that the new ground of rejection has been overcome. (*See also* 37 C.F.R. §1.198 (allowing the Examiner to reopen and reconsider cases under 37 C.F.R. §1.196).) Applicant submitted a Showing of Facts on 9/26/03. As a result, the Board and Code have expressly granted authority to the Examiner to reconsider the Board's decision concerning the indefiniteness of the term "splash controller."

As further support for the Examiner's authority to reconsider the §112 rejection, Applicant cites the prosecution history of another application that recently addressed substantially similar circumstances. In U.S. App. Ser. No. 09/305,865 (hereinafter '865), the applicants appealed the examiner's prior art rejections. (*See* '865's Appeal Brief transmitted 2/12/02.) The Board refrained from addressing the prior art rejections in favor of raising a new §112 indefiniteness rejection. (*See* '865's Appeal Decision mailed 7/23/03.) The applicants submitted a showing of facts. (*See* '865's Showing of Facts and Response transmitted 9/11/03.) The examiner subsequently alerted the Board that the claims satisfied §112. (See '865's Response to BPAI's Instruction, mailed 10/08/03. A copy of '865's Response to BPAI's Instruction is included in an appendix to this Appeal Brief.) The current facts are analogous in terms of the prior art rejection appealed by Applicant, the §112 indefiniteness rejection raised by the Board, and Applicant's Showing and Response. Accordingly, an analogous outcome was warranted -- the Examiner acknowledging the authority to reverse the §112 rejection.

In the Advisory Action dated 12/29/03, the Examiner indicated that the prosecution history in '865 is not binding on the present case. Applicant acknowledges that but contends '865's prosecution serves as persuasive authority for the current Examiner reconsidering the §112 rejection of the currently appealed claims.

As a result, Applicant submits that (1) the Board's statements during prosecution of this application; (2) the Code of Federal Regulations; and (3) the persuasive precedent from the prosecution of another application support the Examiner's authority to determine if the claims meet the definiteness requirement of §112, ¶2. Accordingly, Applicant respectfully requests that the Board at least remand this application with an instruction concerning the Examiner's authority to reconsider the §112, ¶2 issue.

C. Prosecution economy favors the Board's determination that the claims meet the definiteness requirement of §112, ¶2

However, Applicant submits that economy and efficiency may be better served if the Board reconsiders the §112, ¶2 issue at this point. This is especially true given the Examiner's (1) attempt to refute the Showing and Response in the Office Action dated 11/14/03 (discussed below); and (2) attempt to simply recite the Board's reasoning (with less citation to authority) in the untimely Office Action dated 3/11/14.

To that end, Applicant re-presents facts below that were not of record before the Board's decision and responds to the Board's decision dated July 29, 2003.

1. Showing of facts

Applicant acknowledges that the showing of facts "may" include affidavits or declarations. (MPEP §1214.01.) However, in the interest of efficient prosecution, Applicant contends that the facts below are more than sufficient for the Board's determination that the claims satisfy the definiteness requirements of §112, ¶2.

a) MERRIAM WEBSTER'S COLLEGIATE DICTIONARY (10th ed.) defines "configure" as

to set up for operation esp. in a particular way

(*Id.* at p. 242. A copy of the relevant page of MERRIAM WEBSTER is included in an appendix to this Appeal Brief.)

b) The AMERICAN HERITAGE ELECTRONIC DICTIONARY (1992) defines "configure" as

[t]o design, arrange, set up, or shape . . .

(A printout of the relevant definition from the ELECTRONIC DICTIONARY is included in an appendix to this Appeal Brief.)

c) The patents listed below state as follows.

i. U.S. Pat. No. 6,311,365 by Dornier states

[w]hen, as is particularly preferred, the steam cleaning head has a delta shape with slightly rounded sides, steam pressure chambers are again arranged side by side along the edge portion and are followed radially on the inside by a suction region. This suction region is defined by a circular annular arrangement of further steam pressure chambers in the interior of which a suction region is again found.

(Dornier at col. 2, ln. 31-37.)

ii. European Pat. No. 1238766 by Caspar states

[i]t should be understood that the amount of suction applied to the suction apertures depends on the shape and size of the apertures which preferably are round.

(Caspar at ¶[0013].)

iii. U.S. Pat. No. 6,341,387 by Zars states

[a]n additional object of the present invention is that it may be installed as a "kit" on virtually any pool, whether new or existing. The invention is intended to be self-contained and made of materials familiar in the art, preferably polyvinyl chloride

(PVC) piping. The (sic) exact limiting quantity of suction is determined by the internal dimensions and arrangement of the piping and sump.

(Zars at col. 2, ln. 41-47.)

iv. U.S. Pat. No. 4,938,239 by Theurer states

[t]his advantageous combination of the compressed air discharging nozzle and the suction inlet port results in a reinforced suction air flow because the path of this flow is exactly determined by the arrangement of the nozzle within the inlet port so that all the dirt is subjected to the downward pressure of the compressed air as well as the upward suction, which will cause a strong turbulence and detach even strongly adhering dirt particles from the ballast.

(Theurer at col. 3, ln. 30-38.)

v. U.S. Pat. No. 4,522,575 by Tischer states

the discharge pressure and suction pressure are easily determined design parameters . . .

(Tischer at col. 6, ln. 14-16.)

vi. U.S. Pat. No. 3,939,065 by Einersson states

[t]he strength of the pressure and suction waves depends, besides by the design of the pulsation organs, mainly on the peripheral velocity of the drum relative to the peripheral velocity of the suspension in the liquid layers in question.

(Einersson at col. 2, ln. 41-45.)

(Copies of these patents are included in appendices to this Appeal Brief.)

2. Argument

The Board's decision dated July 29, 2003 raised a §112, ¶2 indefiniteness rejection, focusing on independent claim 36's limitations concerning a splash controller that is (1) configured to draw a chemical toward itself; and (2) configured to generate a gas pressure. The Board specifically argued that *suction* applied *through* the splash controller, rather than the *configuration* of the splash controller, is what draws the chemical and generates the gas pressure. (Board Decision at p. 4-5.) Significantly, in support for this argument, the Board interpreted the term "configured" to mean "shaped." (*Id.* at p. 4.) As authority for this interpretation, the Board cited page 242 of MERRIAM WEBSTER'S COLLEGIATE DICTIONARY (10th ed.). (Board Decision at p. 4, footnote 1.) However, as cited above in part 1(a), that reference appears to offer a different definition. Specifically, the definition of the root word "configure" indicates that "configured" means "set up for operation." Moreover, the alternate source cited above in part 1(b) indicates that the term "configured" is broad enough to encompass MERRIAM WEBSTER'S actual definition, the Board's stated definition, and more. Namely, the ELECTRONIC DICTIONARY's definition of the root word indicates that "configured" broadly means "designed, arranged, set up, or shaped."

Moreover, one of ordinary skill in the art would be aware that suction is a function of the design, arrangement, set up, or shape (i.e. configuration) of a relevant device, as demonstrated by the patents cited above in part 1(c). For example, U.S. Pat. No. 6,311,365 by Dornier teaches that a "suction region" is defined by an "arrangement" of pressure chambers. (Dornier at col. 2, ln. 35-36.) European Pat. No. 1238766 by Caspar indicates that "the amount of suction applied" depends on the "shape" of a device's apertures. (Caspar at ¶[0013].) U.S. Pat. No. 6,341,387 by Zars discloses that a "quantity of suction" is determined by the internal dimensions and "arrangement" of piping. (Zars at col. 2, ln. 45-47.) U.S. Pat. No. 4,938,239 by Theurer instructs one of ordinary skill in the art that the path of a "suction air flow" is determined by an "arrangement" of a nozzle with an inlet port. (Theurer at col. 3, ln. 32-34.) U.S. Pat. No. 4,522,575 by Tischer discloses that "suction pressure" is a "design" parameter. (Tischer at col. 6, ln. 14-16.) U.S. Pat. No. 3,939,065 by Einersson indicates that the strength and press of "suction waves" depends in part upon the "design" of pulsation devices. (Einersson at col. 2, ln. 41-43.) Applicant contends that such knowledge is deemed to be imparted to one of ordinary

skill in the art when considering the Specification's support for the definiteness of the terms at-issue.

Further, the Specification in fact provides non-limiting support for designs/arrangements/set ups/shapes of splash controllers. Applicant cited the relevant portions in part V of this Appeal Brief when summarizing the invention. To reiterate, Applicant cited p. 3, ln. 18-19; p. 4, ln. 5-6; and FIGS. 1&2 (addressing vacuum port 18) for the general disclosure of a splash controller. For the specific limitation of a splash controller configured to draw the chemical toward itself, Applicant cited p. 4, ln. 3-5, 16-18 (addressing how the design/ arrangement/set up/shape of vacuum port 18 allows application of suction to a particular area). For the specific limitation of a splash controller configured to generate the relevant gas pressure, Applicant cited p. 3, ln. 3-7, 16-18; and FIGS. 1&2. Applicant alerts the Board that p. 4, ln. 3-7, 16-18 are relevant to this limitation as well.

In addition, it is significant that the Board has acknowledged that suction draws the relevant chemical and generates the relevant gas pressure (and that the Specification discloses so). (*See* Board Decision at p. 5-6.)

Hence, because the Specification discloses a splash controller configured (i.e. designed, arranged, set up, or shaped) for suction; and suction draws the relevant chemical and generates the relevant gas pressure; then the Specification necessarily discloses a splash controller configured to draw the relevant chemical and generate the relevant gas pressure.

As a result, Applicant contends the claims meet §112's definiteness requirement and requests the Board so find.

As mentioned above, Applicant has previously presented these factual showings and arguments to the Examiner. In the Advisory Action dated 12/29/03, the Examiner responded by announcing that Applicant's showing of facts "do not contribute anything new." Applicants alert the Board that the showing of facts do in fact contribute something new; namely, the facts presented above in part 1(a) demonstrate that (1) the Board misquoted the dictionary it relied upon; and (2) the Board's dictionary, other dictionaries, other patents deemed to be known by one of ordinary skill in the art, and the current Specification all demonstrate the definiteness of the term "splash controller" as used in the appealed claims.

Also in an attempt to refute Applicant's showing of facts, the Examiner's Office Action dated 11/14/03 indicates the Examiner's belief that the showing of facts *must* be in accordance

with 37 CFR §1.131 or §1.132, which address the submission of affidavits or declarations. Applicant once again contends that the Examiner's belief is in error. As indicated in the Showing and Response, such affidavits or declarations are *permitted* but not required. (See part 1(a) above.) Applicant's argument is supported by the MPEP itself, which uses permissive language twice in the statement addressing the contribution of 37 CFR §1.131 and §1.132 to an appropriate showing of facts.

The "showing of facts" under the rule *may* be a showing under 37 CFR 1.130, 1.131 or 1.132, as *may* be appropriate.

(MPEP 1214.01(I) (emphasis added).) Thus, while the showing of facts "may" include affidavits or declarations addressed in 37 CFR §1.131 or §1.132, such is not a requirement. Applicant submits that the eight statements presented (see parts 1(a)-(c) above) are indeed (1) facts that (2) were not previously made of record and therefore demonstrate the completeness of Applicant's Showing and Response.

Further support for the completeness of Applicant's Showing and Response can be found by returning to Applicant's analogy to the prosecution history of '865. As mentioned above, the '865 applicants appealed the examiner's prior art rejections (see '865's Appeal Brief transmitted 2/12/02); and the Board refrained from addressing the prior art rejections in favor of raising a new §112 indefiniteness rejection (see '865's Board Decision mailed 7/23/03).

Not mentioned above is the fact that the '865 applicants' subsequent showing of facts was limited to citing dictionary and patent excerpts. (See '865's Showing of Facts and Response transmitted 9/11/03.) The examiner subsequently alerted the Board that the claims satisfied §112. (See '865's Response to BPAI's Instruction, mailed 10/08/03. A copy of '865's Response to BPAI's Instruction is included in an appendix to this Appeal Brief.) The current facts are analogous in terms of the prior art rejection appealed by Applicant, the §112 indefiniteness rejection raised by the Board, and Applicant's Showing and Response. Accordingly, an analogous outcome is warranted – the acknowledgement that the current claims satisfy the §112, ¶2 definiteness requirement.

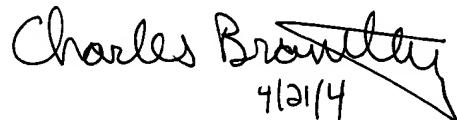
D. Prosecution economy favors the Board's continuing reversal of the Examiner's attempted §102 rejection.

The Board's reversal of the Examiner's §102 rejection was due to the Board's raising the §112, ¶2 issue; the Board made no substantive decision concerning the claims' novelty. (Board Decision at p. 7.) Thus, in the event the Board sees fit to withdraw the §112 rejection, Applicant submits that economy and efficiency may be further served if the Board addresses the Examiner's §102 rejection as part of this Appeal. For refutation of that rejection, Applicant refers the Board to the previous Appeal Brief and Reply Brief transmitted two years ago.

E. Conclusion

The Board's statements made during prosecution of this application, the Code of Federal Regulations, and analogy to a similarly prosecuted application favor the Examiner's authority to reconsider the Board's opinion concerning indefiniteness. Moreover, the facts and arguments presented previously and above support a finding of definiteness. In addition, prosecution economy and efficiency favor the Board withdrawing the §112 rejection and addressing the §102 rejection. Still further, the arguments presented in the Appeal Brief from two years ago support the novelty of the claims, thereby favoring the Board's withdrawal of that rejection as well. Accordingly, Applicant respectfully requests that the Board reverse the Examiner, withdraw all rejections, and allow the claims. Alternatively, Applicants request that the Board remand to the Examiner with directions to reconsider the claims' definiteness in light of the facts and arguments presented previously and above rather than merely echo the Board's decision.

Respectfully submitted,



Charles Brantley
4/30/14

Charles Brantley
Registration No. 38,086
Micron Technology, Inc.
8000 S. Federal Way

Boise, ID 83716-9632
(208) 368-4557
Attorney for Applicant

Appendix 1: Copy of Involved Claims

36. A device for an edge bead, comprising:

a dispenser configured to release a chemical toward said edge bead; and
a splash controller around said dispenser, physically unattached from said edge
bead, and configured to draw said chemical toward said splash controller, wherein
said splash controller is configured to generate a gas pressure around said edge
bead that is lower than an ambient gas pressure, and wherein said splash
controller is configured to physically intercept said chemical.

37. The device in claim 36, wherein said splash controller is around said edge bead.



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CHARLES BRANTLEY MICRON TECHNOLOGY INC 8000 S FEDERAL WAY MAIL STOP 525 BOISE, ID 83716			EXAMINER HU, SHOUXIANG	
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Please find below and/or attached an Office communication concerning this application or proceeding.

RECEIVED

RESPONSE TO BPAI'S INSTRUCTION REGARDING SN 09/305,865***BPAI's Instruction***

In BPAI's ruling made on July 23, 2003 (Paper No. 24) regarding SN 09/305,865, the examiner's rejections of claims 22-36 under 35 U.S.C. 103 were reversed; new ground of rejections under the second paragraph of 35 U.S.C 112 was entered, and this application was remanded to examiner. Also in the ruling, the examiner was instructed to determine if the subject matter of claims 22 to 36 is adequately supported by the original application. More specifically, the examiner was instructed to review the specification to determine whether the insulator or insulative material as required by claims 22-36 is described as part of Appellant's invention.

Examiner's Response

After reviewing the specification, the examiner believes that the subject matter of claims 22 to 36 fairly complies with 35 U.S.C. 112, first paragraph, as explained below.

The subject matter at issue is whether the recited limitations regarding an insulating element, which is recited as "an insulation cap" in claim 22, "an insulator" in claim 25, "an insulative material" in claim 29, and "a top insulator" in claim 33, are reasonably supported by the original application. According to the original application, the device structure of the instant invention (see Fig. 3) comprises a top (or cap) layer (64) atop the gate electrode (74), wherein the top layer (64) is formed of an oxide or

nitride or a combination thereof (see page 9, lines 14-22 of the instant specification). As shown in Fig. 3, in view of the specification (particularly see page 10, lines 15-19), the top layer (64) is apparently patterned to have a width substantially same as that of the gate electrode (74) prior to the formation of the dielectric sidewall spacer (62). The lining layer 58 therein is formed through a re-oxidation process after the formation of the dielectric sidewall spacer (62). It reasonably supports the subject matter that the top layer (64) itself does not cover any of the sidewalls of the gate electrode, although the applicant uses a less definite term of "uncovering" to define such a subject matter in the amended claims.

It is true that the original application does not explicitly describe that such a top layer (64) is an insulating layer. However, the original application does explicitly specify that this top layer is formed of an oxide or nitride or a combination thereof (see page 9, lines 14-22 of the instant specification); and one of ordinary skill in the art would readily recognize that such a top layer is by natural an insulating one, since when an oxide layer is mentioned in the art, especially when mentioned together with a nitride layer, unless specified otherwise, it is normally meant to be an insulating layer (such as a gate oxide layer is a commonly recognized synonym of a gate insulator); and also since such a top layer formed atop the gate electrode is commonly formed with an insulating layer, otherwise it would be a part of the gate electrode if the top layer were not insulative, and it would then be inappropriate to call the layer (74) alone as the gate electrode. Evidence for showing that such a top layer is by natural an insulating one can be readily found in the prior art including the cited prior art references of Takeuchi (US 5,962,892;

see the insulating cap layer 5 in Figs. 4 and 7, also col. 7, lines 26-27 and lines 44-46) and Kim (US 5,693,549; see the insulating cap layers 24 and 34 in Figs. 4 and 5, also see col. 3, lines 21-22, col. 4, lines 22-23, and col. 6, lines 58-59).

According to MPEP § 2163.II, the analysis of whether the specification complies with the written description requirement calls for the examiner to compare the scope of the claim with the scope of the description to determine whether applicant has demonstrated possession of the claimed invention. Such a review is conducted from the standpoint of one of skill in the art at the time the application was filed (see, e.g., *Wang Labs. v. Toshiba Corp.*, 993 F.2d 858, 865, 26 USPQ2d 1767, 1774 (Fed. Cir. 1993)) and should include a determination of the field of the invention and the level of skill and knowledge in the art. Generally, there is an inverse correlation between the level of skill and knowledge in the art and the specificity of disclosure necessary to satisfy the written description requirement. Information which is well known in the art need not be described in detail in the specification. See, e.g., *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379-80, 231 USPQ 81, 90 (Fed. Cir. 1986). In this case, based on the above analysis conducted from the standpoint of one of ordinary skill in the art at the time the application was filed, the examiner believes that the applicant has fairly demonstrated possession of the claimed subject matter of the insulating top (or cap) layer overlying the recited gate electrode. And, the original description also reasonably adequately describes how to form such an insulating top (or cap) layer.

Therefore, the examiner concludes that the subject matter of claims 22 to 36 fairly complies with 35 U.S.C. 112, first paragraph.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH


SHOUXIANG HU
PRIMARY EXAMINER



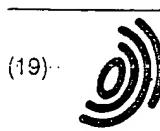
Merriam- Webster's Collegiate® Dictionary

TENTH EDITION

Merriam-Webster, Incorporated
Springfield, Massachusetts, U.S.A.

Appendix 4: Definition from AMERICAN HERITAGE ELECTRONIC DICTIONARY (1992)

con·fig·ure (kən'fɪg"yər) *tr.v.* **con·fig·ured**, **con·fig·ur·ing**, **con·fig·ures**. To design, arrange, set up, or shape with a view to specific applications or uses: *an internal security vehicle that was configured for rough terrain.* [Middle English *configuren*, from Old French *configurer*, from Latin *cōfigūrare* : *com-*, com- + *figūra*, to form (from *figūra*, shape; see **dheigh-** below).]



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(71) Applicant: PAPRIMA INDUSTRIES INC.
Dorval, Québec H9P 2P1 (CA)

(72) Inventors:
• Caspar, Roman C.
Beaconsfield, Quebec H9W 5N7 (CA)
• Hilker, Dieter H.
Mascouche Heights, Quebec J7L 3R6 (CA)

(74) Representative: Rupprecht, Kay, Dipl.-Ing. et al
Meissner, Bolte & Partner
Postfach 86 06 24
81633 München (DE)

(54) Water jet web slitting apparatus

(57) A water jet web slitting apparatus (10) slits a web (16) at a plurality of locations across the web (16) into webs (16a) of smaller width in a winder. The water jet web slitting apparatus (10) utilizes a water jet cutter (20) to slit the web (16). The water jet cutter (20) has a support plate (32) with a pattern of suction apertures (42) located surrounding the cutting aperture (38) of the water jet cutter (20) through which negative pressure is applied to hold the web (16) against the support plate (32) adjacent the water jet cutting apparatus (10) and to prevent the web (16) from fluttering or moving relative to the support plate (32) notwithstanding whether the web (16) is travelling or temporarily at a stopped position. This permits for the water jet to be run continuously without having to be turned off and restarted when the web travel is temporarily stopped and started again because the continually running jet does not re-wet the surface of the web (16) or the edges (16a) cut into the web (16).

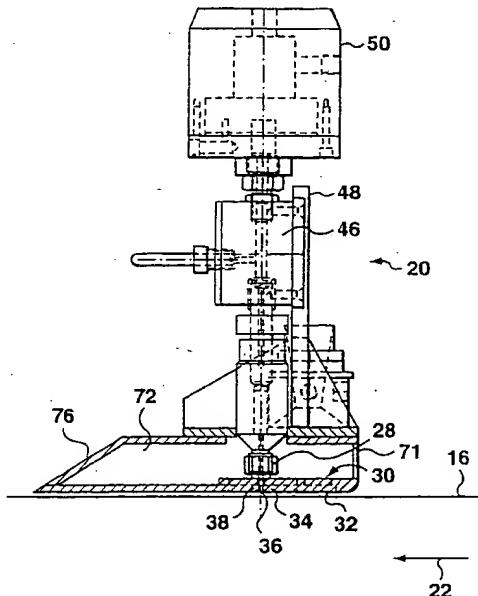


FIG. 2

Description**Field of the Invention**

[0001] The present invention relates to a water jet web slitting apparatus for slitting a web normally travelling in a first direction or remaining stationary relative to the slitting apparatus. In particular it relates to a water jet slitting apparatus that cuts the travelling web and does not wet the web during stoppage in web travel.

Background of the Invention

[0002] In the papermaking industry, knives or water jets are commonly employed to cut through the traveling web or sheet. The knives and water jets are used in edge trimming, slicing, cross-cutting, and tail cutting applications within the papermaking machine. However, water jet cutters have rarely been used to as slitters in a re-winder machine where a wound web of paper is unwound, slit in longitudinal directions and re-wound into webs of reduced width.

[0003] One reason for a limited use of water jets to slit the web at the re-winder is due to the fact that the web travel is stopped when a new reel is loaded at the unwind section of the re-winder or the web is spliced. Portions of the paper adjacent the water jet can be seriously damaged if the paper is re-wetted by the water jet.

[0004] While one possible solution might be to turn the water jet off for every stoppage in web travel, this solution is not practical since the jets must be re-started causing a momentary web surface splash before full pressure is achieved. Furthermore, any movement of the web in the direction of web travel effected by changes in web tension while the water jet is off causes an interruption in the cut line in the web. An interruption of the cut line results in tearing of the paper web when the rolls are separated.

[0005] A water jet cutting head currently in use in the papermaking industry typically includes a base plate having a cover plate defining a chamber. The cover plate has one large upstream circular aperture through which air is drawn to hold the sheet against the cover plate. A second circular aperture is located downstream in the direction of sheet travel relative to the first circular aperture. A water jet is emitted through the second aperture to cut the sheet. Air is drawn through the first aperture and the second aperture by a hose contained in the chamber. The hose passes through the base plate to remove the air from the chamber and maintain a vacuum. While such a described water jet cutting head has good cutting performance characteristics, it is unsuitable as a slitter head for a re-winder.

[0006] A water jet cutting apparatus, as disclosed in U.S. patent 6,021,699 issued February 8, 2000 to Roman Caspar, was developed for cutting strip into the edge of a traveling web where an asymmetrical aperture pattern is utilized only on one side of the water jet to

discriminately support only that portion of the web to be further processed within the papermaking machine or the sheet processing machine while discarding the strip trimmed from the web. Such a water jet cutter would not function as a slitter on a re-winding machine because it would be subject to the potential wetting problems noted above.

[0007] Accordingly, there is a need to provide a water jet cutting device that can be utilized in the dry end of a papermaking machine and does not wet the web during temporary stoppages in web travel.

Summary of The Invention

[0008] The present invention relates to a water jet web slitting apparatus for slitting a web into a plurality of webs of smaller width. In particular, the present invention utilizes a series of water jet cutters mounted on a support beam traversing the width of the beam and supported from the beam by a support arm. The water jet cutters cut through the travelling web to cut the web into the plurality of smaller webs. The present invention utilizes a support plate structure with the water jet cutter that continues to support the web in engagement with the plate when the web is travelling over the plate or is in a stopped position relative to the plate.

[0009] The water jet cutter has a water jet nozzle which preferably continues to emit the water jet through a cutting aperture in the support plate. This jet continues whether or not the web is travelling across the support plate. In order to support the web and prevent it from fluttering or moving relative to the water jet and the support plate, the support plate has a working surface area in which a plurality of apertures are located. The apertures also surround the water jet cutting aperture. These apertures are referred to throughout the specification as suction apertures because a negative pressure or suction is applied through these apertures to pull the web against the suction apertures and against the working surface area of the support plate. As a result, the web is held against the support plate while the water jet passes through the support plate and the web thereby cutting the web and forming new cut edges for the smaller webs. In the event that the web stops its travel over the support plate, the web is held firmly in place against the support plate both upstream and downstream in the direction of web travel relative to the cutting aperture. Also, the web cut edges downstream from the water jet cut are held firmly against the working surface area of the support plate and are not in direct alignment with the water jet because the jet penetrates or blasts a hole through the web with a high speed jet of extremely small diameter. This jet continues to pass through the web without touching the web when the web remains stationary and does not re-wet the web.

[0010] Preferably the suction apertures are arranged in a symmetrical pattern surrounding the water jet cutting aperture both upstream and downstream in the di-

rection of web travel. The suction applied to the suction apertures may be chosen to cause the support plate to grab or hold the web against the plate upstream, downstream and on both sides of the water jet cutting aperture. Hence, the hole pattern arrangement of the present invention provides a uniform suction force about the cutting aperture preventing the cutting edges of the web and the web from fluttering relative to the working surface area.

[0011] The water jet web slitting apparatus, including the water jet of the present invention, may be utilized as a slitter on a re-winder machine where the web is to be slit into a plurality of webs and wound onto separate rolls. Further, because web travel is known to stop to permit separate rolls to be exchanged, the location of the cut is immaterial because it does not result in any damage to the web. For example, if the web is damaged by re-wetting, there is wasted web that has to be trimmed or discarded from the new separate rolls. The present invention is not subject to these problems.

[0012] In accordance with the present invention, the water jet web slitting apparatus comprises a plurality of water jet cutters. Each water jet cutter has a support plate having a working surface area against which the web is supported. The support plate has a cutting aperture passing through the working surface area and a predetermined number of suction apertures passing through the working surface area arranged in a pattern on both sides of the cutting aperture in a first direction of web travel. The cutter has a water jet nozzle located adjacent the cutting aperture for directing a water jet through the cutting aperture and away from the working surface area. The cutter has suction means for applying suction through the suction apertures to draw the web towards the suction apertures and into engagement with the working surface area whereby the web is supported by the support plate on upstream, downstream and both sides of the cutting aperture in the first direction of web travel. The suction applied by the suction means prevents fluttering movement of the web relative to the working surface area to permit the water jet passing through the cutting aperture to cut through the web to form cut edges and to prevent wetting of the web surface and cut edges notwithstanding whether the web is normally travelling in the first direction or is remaining stationary relative to the working surface area of the slitting apparatus.

[0013] It should be understood that the amount of suction applied to the suction apertures depends on the shape and size of the apertures which preferably are round. The cutting aperture is considerably smaller than the suction apertures because the dimension of the jet is relatively small and it is preferred that substantially no suction be applied through the cutting aperture. The water jet nozzle is preferably located closely adjacent the cutting aperture on the opposite side of the support plate from the web to block the cutting aperture preventing suction from being applied to the cutting aperture.

The smaller the cutting aperture, the better the jet cuts through the web and less are the risks of backsplash occurring. The cutting aperture may have a diameter in the range of 0.05 to 3 mm.

[0014] The working area is that area defined around the suction apertures on the support plate and in-between the suction apertures. The working area may extend further beyond the perimeter as defined by the suction apertures by an amount which would be proportional to the amount of suction applied through the suction apertures. In accordance with the present invention, the support plate preferably has a section downstream from the cutting aperture and in line therewith to which suction is not applied. It is across this section that the cut edges of the web pass.

[0015] The suction may be applied to the suction apertures by means of hoses applied directly to the suction apertures or by having an enclosed chamber located behind the support plate in which the water jet nozzle is mounted and from which a suction hose is attached to either the rear surface or side surfaces of the support plate to create a negative pressure within the chamber to draw air in through the suction apertures.

[0016] Preferably, the suction aperture pattern comprises a series of six suction apertures, four of which are located immediately prior to the cutting aperture in the downstream direction of the travel of the web and two apertures located downstream relative to the cutting aperture. The suction apertures are preferably aligned on either side of the cutting aperture whereby at least the downstream suction apertures relative to the cutting apertures have a land area or longitudinal working surface section that is not interrupted by the pattern of the suction apertures. This prevents any suction being applied to the web cut edges as the web travels past the cutting aperture. Alternatively, it should be understood that the present invention provides a water jet cutter which may be placed either above or at any angle not more than 90 degrees from the vertical relative to the travel of web.

Brief Description of The Drawings

[0017] For a better understanding of the nature and objects of the present invention reference may be had to the accompanying diagrammatic drawings in which:

Figure 1 is a perspective view showing the water jet web slitting apparatus of the present invention adapted for slitting a web into a plurality of webs having smaller width by the use of the water jet cutter of the present invention;

Figure 2 is a side view of the water jet cutting apparatus of the present invention;

Figure 3 is a bottom view of the support plate utilized in the water jet cutting apparatus of the present invention; and

Figure 4 is a top view of the support plate chamber mechanism of the water jet cutting apparatus of the

present invention.

Detailed Description of The Drawings

[0018] Referring Figure 1, there is shown a water jet web slitting apparatus 10 having a support beam 12 and stands 14 for supporting the support beam 12. The support beam 12 spans across the width of the web 16. The support beam 12 includes a plurality of arms 18 which hold a water jet cutting apparatus or cutter generally shown at 20. It should be understood that the water jet cutting apparatus 20 include hoses and pneumatic controls (not shown) which will pass down the arms and across the beam so as to be supported away from the travelling web 16. In the present invention, the web travels in the first direction shown by arrow 22 and each of the cutters 20 slits the web 16 at slits or cut edges 24 so that the web 16 now has been cut into a plurality of separate webs 16a having a width which is less than the overall of the web 16.

[0019] It should be understood that this water jet web slitting apparatus 10 typically is utilized in a re-winder machine where a wound roll of paper is un-wound, slit in a longitudinal direction, and re-wound into webs of reduced width. The web 16 is slit by the water jet slitters 20 and the slits 24 become the new edges of each of the smaller webs 16a. The webs 16a are re-wound onto separate winding rolls (not shown). In the practice of the present invention, the web 16 normally travels in the direction of arrow 22 and is stopped from time to time to remove separate wound rolls from the downstream section of the re-winder.

[0020] Referring to Figures 2, 3 and 4, the construction of each of the water jet cutters 20 for slitting slits 24 in web 16 is shown. The water jet cutter 20 has a nozzle 28 located within a chamber 30. The nozzle 28 is mounted relative to a support plate 32 behind a working surface area 34. A water jet 36 pushes through the aperture of cutting aperture 38 in the working surface area 34. Cutting aperture 38 has a preferred diameter of 0.08 to 3 mm. The nozzle 28 is positioned closely adjacent the cutting aperture to block the cutting aperture and prevent or limit suction being applied through cutting aperture 38.

[0021] Referring to Figure 3, the working surface area 34 is shown within the perimeter 40 in the dotted lines and surrounds the cutting aperture 38. Also located within the perimeter 40 of the working surface area 34 are a series of suction apertures 42. The suction apertures 42 are aligned in a symmetrical pattern of two rows of three apertures in the direction 22 of web travel. The suction apertures 42 are circular in shape and have a preferred diameter of 20 mm, which is considerably larger than the smaller diameter of cutting aperture 38. Each row of three suction apertures 42 is aligned in the direction 22 of web travel on opposite sides of the water jet cutting aperture 38. Furthermore, four suction apertures 42 are located upstream of the water jet cutting aperture

38 and two suction apertures 42 are located downstream in the direction 22 of web travel relative to the water jet cutting aperture 38. The suction apertures 42 hold the web 16 against the working surface area 34 to permit the water jet 36 to cut through the web 16.

[0022] The shape of the suction apertures 32 may vary from a circular shape, however for the purposes of the present invention circular apertures are preferred because cutting these holes is less costly and the suction applied across the aperture is relatively uniform. Two additional apertures 42 are positioned upstream than downstream of the water jet cutting aperture 38 insuring the working surface area 34 to grip or draw the web 16 against this working surface area 34 prior to cutting through the web.

[0023] The area 60 immediately downstream of the cutting aperture 38 between the suction apertures 42 provides a land of longitudinal working surface section that is not interrupted by the suction aperture pattern such that no suction is applied to the cut edges or slits 24 of the web 16a.

[0024] The apparatus 10 is further provided with a suction hose 70 shown in Figure 4 which comes in through the rear wall or top wall 72 of the chamber 30 to draw or create a vacuum or negative pressure area within chamber 30 so that suction is drawn through the suction apertures 42.

[0025] The support plate 32 is separated from a top wall 72 by a front wall 71, side walls 74 and angled top or back wall 76. The side walls 74 preferably angle outwardly or diverge from each other as the side walls 74 extend away from the support plate 32 towards the top wall 72. Thus as the sheets or web 16 widens out, it passes smoothly underneath the cutting heads without catching. The back wall 76 is angled downwardly into the web as it extends from the top wall 72 to the support plate 32. The sloping back wall 76 improves air flow over the top wall 72 of air moving with the traveling web 16 as the web is drawn over support plate 32. The improved air flow is less turbulent reducing "low pressure" areas where dust particles might first collect.

[0026] The water jet cutter 20 further includes conduits 46 passing through the neck 48 and upper body 50 of the cutter for connection with the arms 18 of the beam 12.

[0027] It should be understood that the arms 18 of the beam 12 may be adjusted across the beam to adjust the width of the slots or the webs being cut from the master web 16. However, it is not a feature of the present invention that this adjustment is a continuous adjustment that occurs during the web cutting or slitting process. On the other hand, the position of the cutters 20 are adjusted prior to the cutting operation and remain in that position during the cutting operation for a given web 16 to be slit into smaller webs 16a.

[0028] It should be understood that alternative embodiments of the present invention may be readily apparent to a person skilled in the art in view of the above

description for the preferred embodiments of this invention. Accordingly, the scope of the present invention should not be limited to the teachings of the preferred embodiments and should be limited to the scope of the claims that follow.

Claims

1. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling in a first direction (22) relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10), the apparatus (10) characterized by:
 - a) a support plate (32) having a working surface area (34) against which the web (16) is supported, the support plate (32) having a cutting aperture (38) passing through the working surface area (34) and a predetermined number of suction apertures (42) passing through the working surface area (34) arranged in a pattern on both sides of the cutting aperture (38) in the first direction (22) of web travel;
 - b) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34); and,
 - c) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34) whereby the web (16) is supported by the support plate (32) on upstream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel, and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web surface and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10).
2. The water jet web slitting apparatus (10) of claim 1 further characterized in that the pattern of suction apertures (42) is uniform and substantially in a symmetrical pattern providing substantially uniform suction force on the web (16) over the working surface area (34) and around the cutting aperture (38).
3. The water jet web slitting apparatus (10) of claim 1 further characterized in that the working surface area (34) has a longitudinal working surface section
 - 10 (60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby limited suction is applied between the web cut edges (24).
5. 4. The water jet web slitting apparatus (10) of claim 1 further characterized in that the suction apertures (42) are considerably larger than the water jet cutting aperture (38).
- 10 5. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling in a first direction (22) relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10), the apparatus (10) characterized by:
 - a) a support plate (32) having a working surface area (34) against which the web (16) is supported;
 - b) the support plate (32) having a cutting aperture (38) passing through the working surface area (34) whereby the web (16) is supported by the support plate (32) on upstream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel;
 - c) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34) and the water jet nozzle (28) substantially blocking the cutting aperture (38) save for the emission of the water jet;
 - d) the support plate (32) having a predetermined number of suction apertures (42) passing through the working surface area (34) and arranged in a pattern across the working surface area (34) that surrounds the cutting aperture (38); and,
 - f) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34), and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web (16) and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10).
- 20 40 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670 1675 1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770 1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1860 1865 1870 1875 1880 1885 1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100 2105 2110 2115 2120 2125 2130 2135 2140 2145 2150 2155 2160 2165 2170 2175 2180 2185 2190 2195 2200 2205 2210 2215 2220 2225 2230 2235 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6240 6245 6250 6255 6260 6265 6270 6275 6280 6285 6290 6295 6300 6305 6310 6315 6320 6325 6330 6335 6340 6345 6350 6355 6360 6365 6370 6375 6380 6385 6390 6395 6400 6405 6410 6415 6420 6425 6430 6435 6440 6445 6450 6455 6460 6465 6470 6475 6480 6485 6490 6495 6500 6505 6510 6515 6520 6525 6530 6535 6540 6545 6550 6555 6560 6565 6570 6575 6580 6585 6590 6595 6600 6605 6610 6615 6620 6625 6630 6635 6640 6645 6650 6655 6660 6665 6670 6675 6680 6685 6690 6695 6700 6705 6710 6715 6720 6725 6730 6735 6740 6745 6750 6755 6760 6765 6770 6775 6780 6785 6790 6795 6800 6805 6810 6815 6820 6825 6830 6835 6840 6845 6850 6855 6860 6865 6870 6875 6880 6885 6890 6895 6900 6905 6910 6915 6920 6925 6930 6935 6940 6945 6950 6955 6960 6965 6970 6975 6980 6985 6990 6995 7000 7005 7010 7015 7020 7025 7030 7035 7040 7045 7050 7055 7060 7065 7070 7075 7080 7085 7090 7095 7100 7105 7110 7115 7120 7125 7130 7135 7140 7145 7150 7155 7160 7165 7170 7175 7180 7185 7190 7195 7200 7205 7210 7215 7220 7225 7230 7235 7240 7245 7250 7255 7260 7265 7270 7275 7280 7285 7290 7295 7300 7305 7310 7315 7320 7325 7330 7335 7340 7345 7350 7355 7360 7365 7370 7375 7380 7385 7390 7395 7400 7405 7410 7415 7420 7425 7430 7435 7440 7445 7450 7455 7460 7465 7470 7475 7480 7485 7490 7495 7500 7505 7510 7515 7520 7525 7530 7535 7540 7545 7550 7555 7560 7565 7570 7575 7580 7585 7590 7595 7600 7605 7610 7615 7620 7625 7630 7635 7640 7645 7650 7655 7660 7665 7670 7675 7680 7685 7690 7695 7700 7705 7710 7715 7720 7725 7730 7735 7740 7745 7750 7755 7760 7765 7770 7775 7780 7785 7790 7795 7800 7805 7810 7815 7820 7825 7830 7835 7840 7845 7850 7855 7860 7865 7870 7875 7880 7885 7890 7895 7900 7905 7910 7915 7920 7925 7930 7935 7940 7945 7950 7955 7960 7965 7970 7975 7980 7985 7990 7995 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8060 8065 8070 8075 8080 8085 8090 8095 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8160 8165 8170 8175 8180 8185 8190 8195 8200 8205 8210 8215 8220 8225 8230 8235 8240 8245 8250 8255 8260 8265 8270 8275 8280 8285 8290 8295 8300 8305 8310 8315 8320 8325 8330 8335 8340 8345 8350 8355 8360 8365 8370 8375 8380 8385 8390 8395 8400 8405 8410 8415 8420 8425 8430 8435 8440 8445 8450 8455 8460 8465 8470 8475 8480 8485 8490 8495 8500 8505 8510 8515 8520 8525 8530 8535 8540 8545 8550 8555 8560 8565 8570 8575 8580 8585 8590 8595 8600 8605 8610 8615 8620 8625 8630 8635 8640 8645 8650 8655 8660 8665 8670 8675 8680 8685 8690 8695 8700 8705 8710 8715 8720 8725 8730 8735 8740 8745 8750 8755 8760 8765 8770 8775 8780 8785 8790 8795 8800 8805 8810 8815 8820 8825 8830 8835 8840 8845 8850 8855 8860 8865 8870 8875 8880 8885 8890 8895 8900 8905 8910 8915 8920 8925 8930 8935 8940 8945 8950 8955 8960 8965 8970 8975 8980 8985 8990 8995 9000 9005 9010 9015 9020 9025 9030 9035 9040 9045 9050 9055 9060 9065 9070 9075 9080 9085 9090 9095 9100 9105 9110 9115 9120 9125 9130 9135 9140 9145 9150 9155 9160 9165 9170 9175 9180 9185 9190 9195 9200 9205 9210 9215 9220 9225 9230 9235 9240 9245 9250 9255 9260 9265 9270 9275 9280 9285 9290 9295 9300 9305 9310 9315 9320 9325 9330 9335 9340 9345 9350 9355 9360 9365 9370 9375 9380 9385 9390 9395 9400 9405 9410 9415 9420 9425 9430 9435 9440 9445 9450 9455 9460 9465 9470 9475 9480 9485 9490 9495 9500 9505 9510 9515 9520 9525 9530 9535 9540 9545 9550 9555 9560 9565 9570 9575 9580 9585 9590 9595 9600 9605 9610 9615 9620 9625 9630 9635 9640 9645 9650 9655 9660 9665 9670 9675 9680 9685 9690 9695 9700 9705 9710 9715 9720 9725 9730 9735 9740 9745 9750 9755 9760 9765 9770 9775 9780 9785 9790 9795 9800 9805 9810 9815 9820 9825 9830 9835 9840 9845 9850 9855 9860 9865 9870 9875 9880 9885 9890 9895 9900 9905 9910 9915 9920 9925 9930 9935 9940 9945 9950 9955 9960 9965 9970 9975 9980 9985 9990 9995 10000 10005 10010 10015 10020 10025 10030 10035 10040 10045 10050 10055 10060 10065 10070 10075 10080 10085 10090 10095 10100 10105 10110 10115 10120 10125 10130 10135 10140 10145 10150 1015

cutting aperture (38).

7. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the working surface area (34) has a longitudinal working surface section (60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby no suction is applied between the web cut edges (24). 5

8. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the suction apertures (42) have a diameter that is considerably larger than the water jet cutting aperture (38). 10

9. The water jet web slitting apparatus (10) of claim 6 further **characterized in that** the working surface area (34) has a perimeter (40) within which the web (16) is supported and the pattern of suction apertures (42) extends outwardly from the cutting aperture (38) to the perimeter (40) of the working surface area (34). 15

10. A water jet web slitting apparatus (10) for slitting a web (16) normally travelling relative to the slitting apparatus (10) and capable of remaining stationary relative to the slitting apparatus (10) into a plurality of webs (16a) of smaller width, **characterized by:** 20

a support beam (12) traversing the width of the web (16); 25

a plurality of support arms (18) carrying a water jet cutter (20) and mounted along the support beam (12) to define the width of the smaller webs (16a) to be cut; 30

the water jet cutter (20) comprising:

a) a support plate (32) having a working surface area (34) against which the web (16) is supported, the support plate (32) having a cutting aperture (38) passing through the working surface area (34) and a predetermined number of suction apertures (42) passing through the working surface area (34) arranged in a pattern on both sides of the cutting aperture (38) in the first direction (22) of web travel; 35

b) a water jet nozzle (28) located adjacent the cutting aperture (38) for directing a water jet through the cutting aperture (38) and away from the working surface area (34); and, 40

c) suction means (70) for applying suction through the suction apertures (42) to draw the web (16) towards the suction apertures (42) and into engagement with the working surface area (34) whereby the web (16) is supported by the support plate (32) on up- 45

stream, downstream and on both sides of the cutting aperture (38) in the first direction (22) of web travel, and the suction applied by the suction means (70) preventing fluttering movement of the web (16) relative to the working surface area (34) to permit the water jet passing through the cutting aperture (38) to cut through the web (16) to form cut edges (24) and to prevent wetting of the web surface and cut edges (24) notwithstanding whether the web (16) is normally travelling in the first direction (22) or is remaining stationary relative to the working surface area (34) of the slitting apparatus (10). 50

11. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the pattern of suction apertures (42) is uniform and substantially in a symmetrical pattern providing substantially uniform suction force on the web (16) over the working surface area (34) and around the cutting aperture (38). 55

12. The water jet web slitting apparatus (10) of claim 11 further **characterized in that** the working surface area (34) has a longitudinal working surface section (60) downstream from the cutting aperture (38) in the first direction (22) of web travel whereby no suction is applied between the web cut edges (24). 60

13. The water jet web slitting apparatus (10) of claim 12 further **characterized in that** the suction apertures (42) have a diameter that is considerably larger than the water jet cutting aperture (38). 65

14. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the water jet nozzle (28) substantially blocks the cutting aperture (38) save for continuous emission of the water jet. 70

15. The water jet web slitting apparatus (10) of claim 1 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of web travel. 75

16. The water jet web slitting apparatus (10) of claim 5 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of web travel. 80

web travel.

17. The water jet web slitting apparatus (10) of claim 10 further **characterized in that** the support plate (32) has a front wall (71), two side walls (74), a back wall (76) and a top wall defining a chamber (30) into which suction is applied to draw a negative pressure through the suction apertures (42); and the back wall (76) sloping outwardly away from the top wall to the support plate (32) in the first direction (22) of web travel. 5 10

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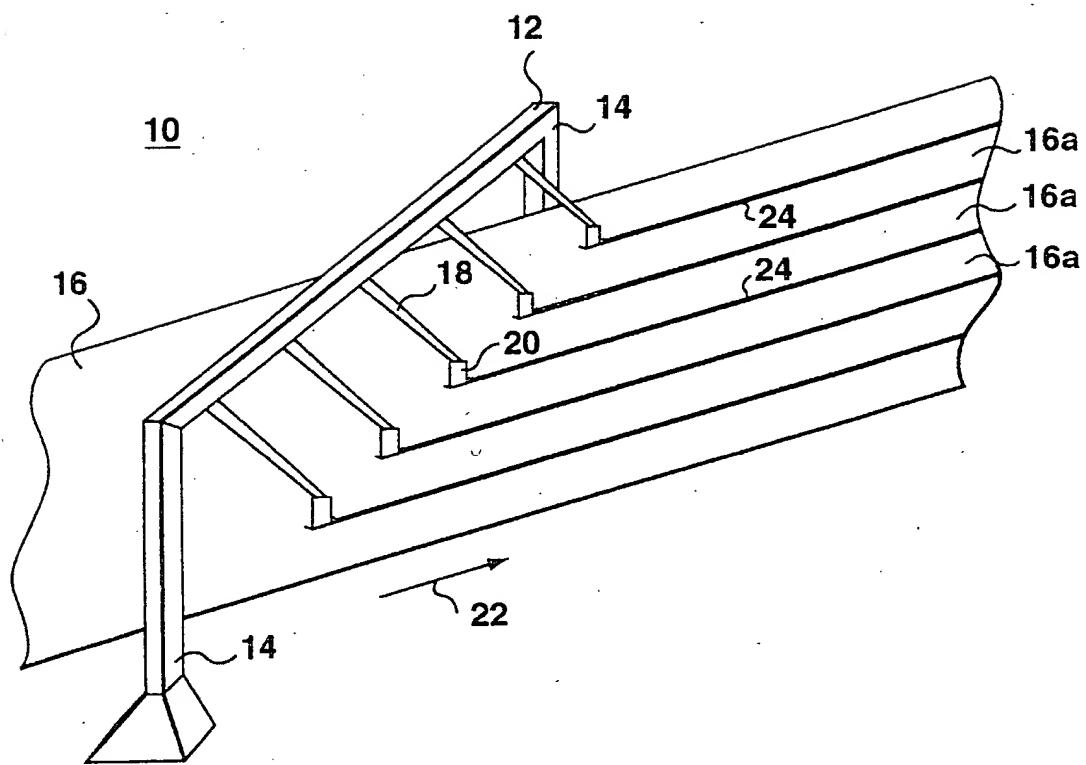


FIG .1

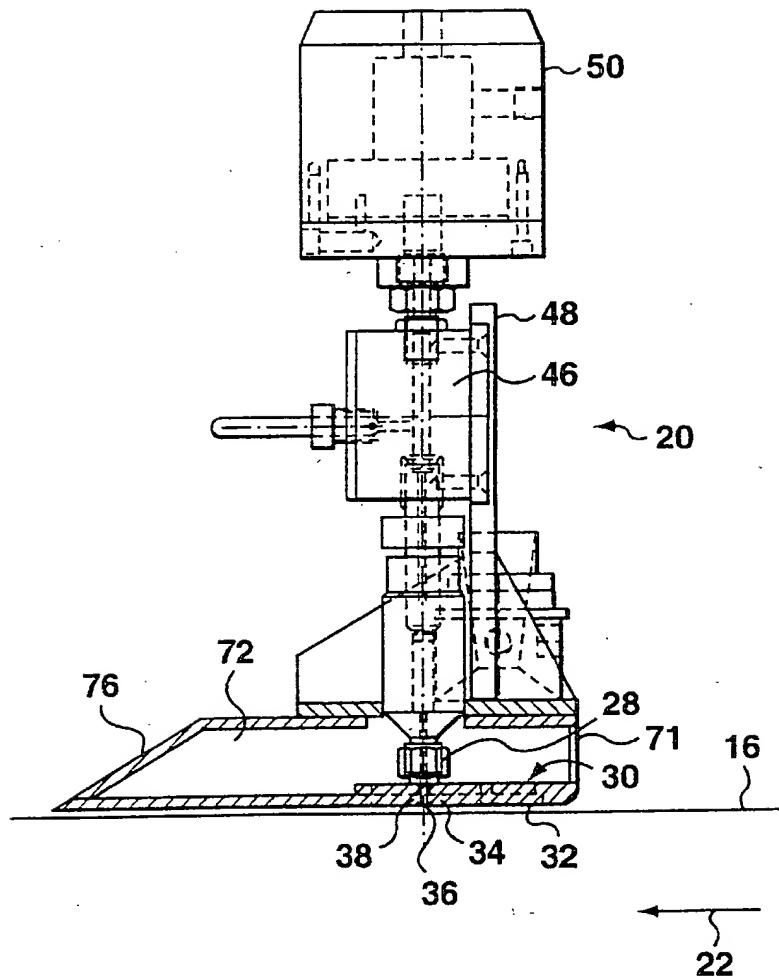


FIG. 2

